Tallpines
Environmental
Consulting Co.

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Flagstaff, Arizona 86001
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October 9, 2017

City of Sedona, Public Works
102 Roadrunner Drive
Sedona, Arizona 86336

Attn: Ryan Mortillaro, EIT, Assistant Engineer

RE: Microbial Assessment and Pre-Demolition Asbestos Testing at the Sedona Sinagua Building
55 Sinagua Drive in Sedona, Arizona
Tallpines Job No. 17TEC155.ASM

Background Information

On September 29, 2017, Tallpines Environmental Consulting Co. (Tallpines), Flagstaff, conducted a microbial assessment of the City of Sedona Sinagua building located at 55 Sinagua Drive in Sedona, Arizona. Tallpines was initially contacted on the telephone by Ryan Mortillaro, EIT, Assistant Engineer, Public Works, who stated that the building was pending renovation and he requested that building materials scheduled for disturbance be tested for asbestos. In addition, he asked that the building be tested for mold. Based on this information, Tallpines conducted a limited (number of samples) microbial assessment, and targeted sampling for asbestos.

Field Activities

The limited microbial (microscopic organisms; mold, bacteria) assessment targets organic contamination related to water-damaged building materials. The assessment was conducted by Patty Rubick Luttrell, R.G., C.M.C., Principal, Tallpines. Luttrell is a registered geologist (R.G.) in the State of Arizona, and is board-approved by the American Council for Accredited Certification (ACAC) as a certified microbial consultant (CMC).

Access to the building was provided by James Crowley, EIT, RLS, Associate Engineer, City of Sedona. Tallpines visually assessed interior rooms, accessible portions of the attic and crawlspace, and exterior, and noted the following:

- The exterior of the reported 4,000 square foot (SF) building is surfaced with painted stucco. The roof appears to have been recently re-roofed with asphaltic roof shingles. Roof gutters are present on the north and south sides of the pitched roof, and partial portions of the west and east perimeter walls. In the majority of locations, downspouts drain directly against the building envelope instead of being directed away from perimeter walls. There is a storm drain culvert off the southwest side of the Newman Computer Services portion of the building, but the downspout falls short of the culvert and instead is directed at the base of the stucco wall. There is visible water-damage (stains) and cracks in the stucco on the west and south walls of the Newman Computer Services; most likely in response to moisture from the gutter downspout wicking upward. There is an inactive

evaporative water cooler mounted on the north wall of the computer room with significant water stains down the perimeter wall.

- Another location on the building with visible water-damage to the stucco is on the exterior north wall of the proposed Jury room; adjacent to the steps leading off of the deck. The source of moisture appears to be from when the overhead gutter became clogged allowing water to impact the stucco. The interior side of this same water-damage is the northeast wall of the proposed Jury room. Looking at this interior location laterally from the sliding glass door, a slight bulge/warp is visible in the wooden baseboard suggesting that the water has penetrated the perimeter wall system. It should be noted that any cracks in the exterior stucco and/or stucco penetrations need to be repaired, and checked annually by maintenance so that water penetration is minimized to interior building materials.

- Upon entry to the building, Tallpines noted no moldy odors but instead a strong chemical odor. Crowley stated that the carpet had been recently shampooed and a fragrant deodorizer had been used. Within a half-hour of working inside the building, Tallpines propped the back doors open so that fresh outdoor air could dilute the chemical odors that were irritating to the eyes.

- Access to the attic space is inside a small storage room adjacent to the proposed Clerk's room. Access inside the attic is very restricted due to HVAC units, ductwork, insulation, and electrical conduit. Air inside the attic space is dry with no moldy odors. The accessible fiberglass insulation, floor of the attic, plywood sheathing, and rafters show no evidence of visible mold and only minor water stains. Tallpines did observe a curved piece of metal ductwork lined with fiberglass insulation. Back inside the proposed Clerk's room, Tallpines observed damaged/exposed fiberglass insulation on the interior of the metal ductwork inside the ceiling-mounted return air vent. This is an area of concern for poor indoor air quality because once the fibers of glass (fiberglass) become entrained inside the recirculating supply air, they are drawn into the blower and are ground to a small enough size so that the glass fibers become respirable. Respirable-sized fibers can then be inhaled deeply into the lungs which can result in irritation to the lungs, eyes, and skin. With extended exposure, the health effects of respirable-sized glass fibers can be more severe (Hazards of Insulation, John Bower, 1989).

- Inside the crawlspace, Tallpines noted that the area under the subfloor is under positive pressure. This means that somewhere inside the space the ductwork has been breached, and heated/air-conditioned air is being supplied to the crawlspace rather than occupied spaces. This needs to be addressed. Tallpines noted no moldy odors or evidence of moisture within accessible areas of the crawlspace. Vents are visible, but it is unknown if their spacing or if the number of vents are adequate to properly ventilate the crawlspace.

- Inside the current IT room, Tallpines observed significant water-damage to the textured drywall window sill beneath the window-mounted air-conditioner (AC) unit. The source of water would be from on-going condensation from the AC unit.

- Tallpines observed water-damage to the baseboard inside the southeast corner of the northeast entry leading to the proposed Court room. This is the wall proposed for removal for access to the Norton Computer Services lease. The baseboard exhibits water-damage as well as the drywall behind it. This is a perimeter wall. Walking over to the Newman Computer Services lease, there are visible water stains inside the northeast storage closet; stains on the door header and down the left/north side of the door as well as at the ceiling/ wall interface on the northeast wall. The stains appear to be from former roof leaks, or possibly from the exterior evaporative cooler.

- The remaining rooms inside the building appear to be in good condition with no evidence of water stains, mold, or moldy odors.

- Using a *FLIR B2* infrared thermal digital camera, Tallpines was unable to document temperature variations suggestive of current moisture inside the building, plumbing walls, attic, crawlspace, or on the exterior of the building.

Analytical Test Results

Sampling for Asbestos

In anticipation of pending renovation/demolition activities, Tallpines collected bulk samples of troweled-on-textured drywall, sprayed-on-textured drywall, 12" x 12" acoustical ceiling tiles/brown mastic, carpet/net/adhesive (2 different types), patterned linoleum/backing/adhesive, 4" gray rubber covebase/adhesive, formica counter top/adhesive, paint/stucco/concrete, and green asphaltic roof shingles/roof tar/black felt. The friable bulk samples (easily crushed with hand pressure) were shipped to Fiberquant Analytical Services, Phoenix, for analysis, and the nonfriable samples were analyzed by Crisp Analytical Services, Carrollton, Texas. The sampled building materials tested negative for asbestos content. The AHERA certificates, health & safety meeting sheet, sample map, chain-of-custody, and analytical test results, are attached.

Dust sample 17TEC155-05, collected from the ceiling-mounted return air duct inside the proposed Clerk's room, is reported with two (2) fiber types; cellulose (20-30% of the dust sample), and 50-60% glass fiber. Glass fiber is what is commonly termed fiberglass, and it makes up the majority of the debris inside the dust sample collected from the return air duct. This documents that re-circulating air inside the building is contaminated with glass fibers.

Sampling for Mold

Following the visual assessment for mold, Tallpines collected a total of five (5) samples for this limited assessment; three (3) *WallChek* air samples collected inside closed wall cavities, a single (1) composite surface swab collected from the return air vent inside the proposed Court room, and dust sample -05, discussed in the previous paragraph.

WallChek air sample 17TEC155-01, collected inside the northeast wall cavity inside the proposed Jury room, is reported with a total fungal spore count of 2,600 counts per cubic meter (c/m^3) of air. Reported genera of fungal spores include 330 c/m^3 of *Chaetomium*, 1,700 c/m^3 of *Penicillium/Aspergillus*, and 99 c/m^3 of *Stachybotrys*. These 4 genera of spores have the ability to produce mycotoxins (stable chemical toxins produced by fungal mold), and are of concern when measured in elevated counts in the indoor environment. *Stachybotrys* is a slow-growing mold, requires a minimum of 2 weeks of >85% relative moisture before it begins to bloom, and is capable of releasing mycotoxins. The mold spore population (types and counts) measured inside this perimeter wall cavity contains an elevated count of toxic spores, and warrants remediation of contaminated materials. The remaining spores are classified as allergens; the ability to induce an allergic response in humans.

WallChek air sample -02, collected inside the water damaged window sill beneath the AC unit inside the current IT room, is reported with a total fungal spore count of 14,000 c/m^3 of air consisting of *Penicillium/Aspergillus*. The mold spore population measured inside this perimeter wall cavity contains an elevated count of toxic spores, and warrants remediation of contaminated materials.

WallChek air sample -03, collected inside the southeast corner of the northeast entry leading to the proposed Court room, is reported with a total fungal spore count of 5,300 c/m^3 of air. Reported genera of fungal spores include 4,600 c/m^3 of *Penicillium/Aspergillus*, and allergenic mold spores. The mold spore population measured inside this perimeter wall cavity contains an elevated count of toxic spores, and warrants remediation of contaminated materials.

Composite surface swab sample -04, collected from the interior of the return air duct inside the proposed Court room, is reported with a total fungal spore count of 1,400 counts per square centimeter (c/cm^2). Reported genera of fungal spores of concern include 77 c/cm^2 of *Penicillium/Aspergillus*, and 77 c/cm^2 of *Stachybotrys*. Although these are not elevated counts, the presence of recirculating spores of *Stachybotrys* is of concern. Sampling dust inside a return air vent represents a long-term history of recirculating air, and *Stachybotrys* should not be present in recirculating occupied air. The presence of toxic spores and glass fibers (previously discussed) warrants a professional biocleaning and decontamination of the ductwork.

The certified microbial consultant (CMC) certificate, field sample map, sampling data sheet, chain-of-custody, EMLab P&K analytical test results, and references for molds of concern, are attached.

Recommendations

- Based on visual observations and the analytical test results, Tallpines recommends at a minimum, 1) hire an HVAC Contractor to determine which HVAC ducts are lined with fiberglass insulation, and remove for disposal, 2) determine why the crawlspace is under positive pressure and correct, 3) hire a remediation Contractor to remove mold contaminated materials in the northeast wall of the proposed Jury room (opposite exterior water-damage to stucco), under the window-mounted AC unit inside the current IT room, and inside the southeast corner of the northeast entry leading to the proposed Court room; follow contamination laterally and vertically, as warranted, 4) following a through biocleaning by the remediation Contractor, have a 3rd party industrial hygienist such as Tallpines conduct post-remediation air monitoring inside the regulated work areas to document the completeness of the work prior to reoccupancy by employees, 5) after all remediation and removal of fiberglass ductwork is complete have the remaining hard ducts/air handlers thoroughly decontaminated of glass fibers and residual toxic mold spores, 6) remove the inactive evaporative water cooler off the north wall of the computer services lease, and determine if the water stains inside the northwest storage closet are due to the evaporative cooler and/or a former roof leak, and correct source(s) of moisture intrusion, 7) extend all gutter downspouts on the building so that stormwater can no longer impact the building envelope, 8) infill all cracks and water-damaged locations in the exterior stucco, and 9) conduct proactive annual maintenance of cracks in stucco.

- All remediation work should be completed by a State licensed Contractor qualified to conduct bioremediation. If requested, the Contractor can also conduct fiberglass decontamination of the ductwork/air handlers. The selected remediation Contractor is to conduct remediation using negative air pressure, and personal protective equipment (PPE). The Contractor is to use good OSHA work practices and engineering controls to minimize the release of airborne spores during the removal activities. Demolition and removal of microbially contaminated building materials, and a thorough biocleaning is to be conducted inside the regulated work areas. It is essential that contaminated building materials scheduled for removal be wet with a fungicide/biocide prior to disturbance. Dry removal can result in the aerosolization of millions of spores.

- It is critical that the sources of water intrusion that have supported the indoor growth of mold be corrected. Failure to fix the source(s) of water intrusion, and leaving microbially contaminated materials in-place can result in on-going contamination, destruction of building materials, and potential health complaints.

Tallpines appreciates the opportunity to have been of service to you on this limited microbial assessment and targeted sampling of building materials for asbestos. If you have any questions concerning this report, or need additional environmental services, please contact us at (928) 774-0060.

Respectfully Submitted,
Tallpines Environmental Consulting Co.

REGISTERED GEOLOGIST
CERTIFICATE NO.
28248
PATTY RUBICK LUTTRELL
Date Signed 10/09/17
ARIZONA, U.S.A.
EXPIRES 09/30/18

Patty Rubick Luttrell, R.G., C.M.C.
Principal & Certified Microbial Consultant

Addressee: .pdf report

ATTACHMENTS

25511-3693791-496861

THE ASBESTOS INSTITUTE

Certifies that PATTY R LUTTRELL

has attended the EPA approved course

AHERA Building Inspector Refresher

and successfully passed and completed
the competency exam.

This training meets all requirements for asbestos
accreditation under TSCA Title II.

THE ASBESTOS INSTITUTE
arizona · california · nevada
EST. 1988

Issue Date : 14-Apr 2017

Expiration Date : 14-Apr 2018

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Approved Instructor

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TALLPINES' DAILY FIELD SAFETY MEETING

Project Sedona Sinagua Building Job No. 17TEC155.ASM

Site Address 55 Sinagua Drive, Sedona Client City of Sedona, Owners

Date September 29, 2017 Time 11am

Health & Safety Officer (HSO) Patty Luttrell, Industrial Hygienist

Type of Work: Pre-Demolition NESHAP Inspection

ON-SITE POTENTIAL PHYSICAL/CHEMICAL HAZARDS			
	POTENTIAL HAZARDS		**PREVENTION MEASURES**
1)	The release of airborne asbestos fibers from friable suspect-ACBMs and/or suspect-ACBM samples made friable during the sampling event.	1)	Sample under wetted conditions using a spray surfactant. Use a HEPA vacuum *during* the sampling event.
2)	Electrical hazards when sampling through drywall.	2)	Use of an electronic Zircon Video-scanner to detect "hot" electrical wires behind walls and ceilings prior to sampling.
3)	Injury from climbing on roofs, high ceilings or other inaccessible areas requiring the use of a ladder.	3)	The inspectors are to work in teams whenever possible and take precautions to minimize the risk of accidental falls/slips.
4)	Encounter with skunks, cats, dogs, insects and/or rodents when sampling in crawl spaces, basements, and attics/plenums. Potential hazards include being sprayed, bites which may transmit rabies, the airborne Hanta virus transmitted from rodent droppings, and the bubonic plaque bacteria transmitted by fleas.	4)	Avoid all physical contact. If an animal appears to be ready to attack or a rabid animal is observed, vacate the area immediately. If rodent droppings are observed in a designated sampling area (the threat of Hanta virus), relocate to a safer location. If a dead animal is observed, vacate immediately and sample in a safer location. Report suspicious animal behavior to building occupants and/or building owner.
5)	Cuts/injuries from the use of sampling tools.	5)	Retract blades when not in use, use gloves as appropriate, & carry sampling tools in a fanny pack.
PERSONAL PROTECTION EQUIPMENT (PPE), LEVEL C			
1)	Half- or full-face, negative air pressure respirator with NIOSH-approved HEPA cartridges having a TWA of not less than 0.05 mg/m^3 and full-body Tyvek disposable suits.	1)	To be worn when inspector is sampling *friable* suspect-ACBMs or suspect-ACBMs *made friable* during the sampling event.
2)	Sturdy work boots/shoes with skid-proof tread	2)	To be worn by inspector to minimize the risk of falls and slips.

TALLPINES' DAILY FIELD SAFETY MEETING, page 2

ADDITIONAL SAMPLING PROCEDURES

1) If the Inspectors identify friable suspect-ACBMs or materials which will be rendered friable during the sampling event, building occupants will be asked to vacate the area during the sampling activities. Occupants will leave the area and the entrance will be flagged with banner tape labeled *"DANGER ASBESTOS Cancer and Lung Disease Hazard, Authorized Personnel Only, Respirators and Protective Clothing Are Required in This Area"*.

2) Following sampling activities, all disposable Tyveks, gloves, sampling decontamination wipe cloths, used HEPA filters, etc., will be disposed of in Ziplock plastic bags containing labels that read *"DANGER, Contains Asbestos Fibers, Avoid Creating Dust, Cancer and Lung Disease Hazard, Avoid Breathing Airborne Asbestos Fibers"*. The labels will be adhered *across* the ziplock opening to deter opening of the bags. The waste bags will be removed off-site by Tallpines personnel and secured.

3) Use disposable vinyl gloves when sampling in bathrooms, when sampling fiberglass, and as deemed appropriate.

4) Sampling of drywall, roofing and caulking materials will be repaired using products which do not contain asbestos. An MSDS of each of these products will be included in the AHERA survey report generated for each facility.

EMERGENCY PROCEDURES

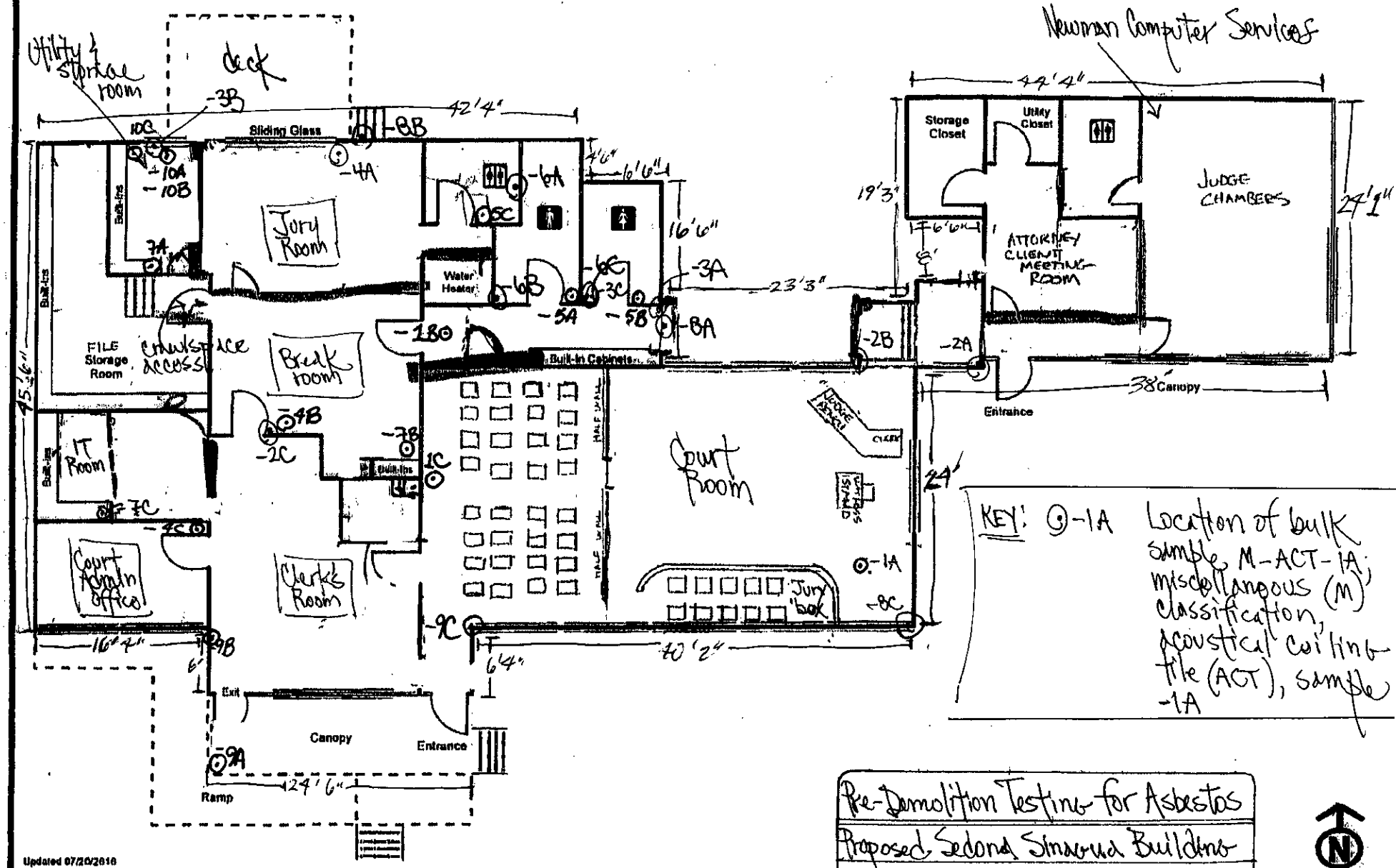
1) In the event of an accident, the injured personnel will be transported to the Sedona Urgent Care located at 2530 West Highway 89 in Sedona (203-4813).

2) If the injury is severe, **call 911** for emergency personnel response

SAFETY MEETING ATTENDEES

Name (Printed) and Date	*Signature*
Patty Luttrell, H&SO 09/29/17	P. Luttrell
Mary Berta, Industrial Hygiene Technician	Mary C Berta

City of Sedona
55 Sinagua Drive



KEY: ⊙-1A Location of bulk sample, M-ACT-1A; miscellaneous (M) classification, acoustical ceiling tile (ACT), sample -1A

Pre-Demolition Testing for Asbestos
Proposed Sedona Sinagua Building
Talkptres Job No. 17TEC155.ASM

Updated 07/20/2018
GIS, City of Sedona
g:\data\projects\buildings\buildingfootprints\mxds\55sinaguadr.mxd

Map not to scale

(01)

Originator:
TALLPINES ENVIRONMENTAL CONSULTING CO.
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FLAGSTAFF, AZ 86001
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ASBESTOS CHAIN-OF-CUSTODY

Laboratory:
FIBERQUANT ANALYTICAL SERVICES
5025 SOUTH 33rd STREET
PHOENIX, AZ 85040
(602) 276-6139 (FAX) 276-4558

JOB NO.: 17TEC155.ASM | PROJECT NAME: Sedona Sinkhole Buildings
CLIENT/COMPANY: City of Sedona c/o Tallpines Environmental
SAMPLER (SIGNATURE): P. Huntrell | SAMPLER (PLEASE PRINT): P. Huntrell

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE LOCATION	FRIABLE (Y/N)	SAMPLE METHOD: BULK	WIPE	PERSONAL AIR	INSIDE/OUTSIDE AREA AIR	FINAL CLEARANCE	ANALYSIS METHOD: PLM	PCM	TEM	TOTAL VOLUME (LITERS)	HOMOGENEOUS AREA DESCRIPTION
S-COT-2A	9/29/17	2:08	Court room NE landing, SE wall	N	X					X				(paint/troweled-on-texture/drywall
-2B		2:13	Court room NE hall, west wall	N	X					X				materials
-2C		2:19	Break room, SW wall	N	X					X				paint/heavy sprayed-on-texture/
S-COT-3A		2:21	Restroom hall, east wall	N	X					X				drywall materials
-3B		2:24	Utility/storage, north wall	N	X					X				
-3C		2:28	Women's restroom, SW wall	N	X					X				
(*) 17TEC155-05	V	4:40	Clerk's room return air duct	Y	X					X				(dust from fiberglass-lined duct)

(*) Analyze for fiberglass & other fibers

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME
P Huntrell						
SHIPPER INFORMATION: FedEx 8056-1801-6400	DATE	TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE: 10/3/17	TIME: 1026	

PCM TAT: ☐ 1-4 HOURS ☐ 24 HOURS

SAMPLE PROCESS TURNAROUND TIME: ☐ 1-6 HOURS ☒ 1-3 DAYS ☐ 10-15 DAYS

Review of Analysis Request (Initials): [illegible] 20171020 3

for FedEx
DP

FIBERQUANT ANALYTICAL SERVICES

Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample

JobNumber: 201710203

Client: TALLPINES ENV CONSLTNG CO
10 W DALE AVE

FLAGSTAFF, AZ 86001-0000
Office Phone: (928) 774-0060
FAX: (928) 774-0051

 # Samples: 7 PLM **Rec:** 10/3/2017 **Method:** EPA 600/R-93/116 The "New" Method; see below
Client Job: Sedona Sinagua Building **PO Number:** 17TEC155.ASM
Report Date: 10/4/2017 **Date Analyzed:** 10/4/2017 **Routing Number:** -

Method and Analysis Information: **Fiberquant Internal SOP:** PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of <=1 % asbestos as "negative" and >1 % asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber identification and quantitation is the "Standard Operating Procedures for the Analysis of Asbestos in Bulk Samples using Polarized Light Microscopy", Chapter 7 of the Quality Assurance and Management Manual. This SOP and its associated reporting have been designed to satisfy all requirements in both EPA Method 600/M4-82-020 (The Interim Method) and EPA Method 600/R-93/116 (The New Method). The Interim Method is the required method for AHERA (US EPA 40 CFR Pt. 763), but this method calls for the reporting of composited results of multi-layered samples that is no longer an acceptable reporting practice in most circumstances. Current EPA rules, such as NESHAP (US EPA 40CFT Pt. 61), as well as NVLAP accreditation policies, call for separate reporting for each layer of multi-layered samples. The New Method contains the same procedures for identification and quantification of asbestos as does the Interim Method, except that multi-layered samples are reported to comply with the latest US EPA rule. Fiberquant not only reports the asbestos content of each layer of multi-layered samples separately (satisfying current EPA and NVLAP reporting requirements), but Fiberquant also reports what percentage of the sample each layer comprises. Therefore, the results may be arithmetically composited to satisfy the reporting requirements of the Interim Method. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain <= 1% asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Polutants, Nov. 1990) in order to rely on analytical results that are <= 1%. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but <= 1% as "borderline negative", and results where asbestos was >1 % but <= 2% as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as <=1%. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the

estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab code #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

Job Analysis Notes:

PLM Analysis Summary: **Job Number: 201710203** Sedona Sinagua Building

Sample Number / Layer	Color	Apparent Layer Type *	Lab Number / *Asbestos Results*	Apparent Sample Type *	Positive Layer Yes or No
Sample # **S-TOT-2A**			2017-10203- 1	Wall System	Positive Layer? No
Layer # 1	off-white	paint	*no asbestos detected*		
Layer # 2	off-white	texture/joint compound	*no asbestos detected*		
Layer # 3	tan	paper/cardboard	*no asbestos detected*		
Layer # 4	white	drywall core	*no asbestos detected*		
Sample # **S-TOT-2B**			2017-10203- 2	Wall System	Positive Layer? No
Layer # 1	off-white	paint	*no asbestos detected*		
Layer # 2	off-white	texture/joint compound	*no asbestos detected*		
Layer # 3	tan	paper/cardboard	*no asbestos detected*		
Layer # 4	white	drywall core	*no asbestos detected*		
Sample # **S-TOT-2C**			2017-10203- 3	Wall System	Positive Layer? No
Layer # 1	red	paint	*no asbestos detected*		
Layer # 2	white	texture/joint compound	*no asbestos detected*		
Layer # 3	off-white	paper/cardboard	*no asbestos detected*		
Layer # 4	white	texture/joint compound	*no asbestos detected*		
Layer # 5	tan	paper/cardboard	*no asbestos detected*		
Layer # 6	white	drywall core	*no asbestos detected*		
Sample # **S-SOT-3A**			2017-10203- 4	Wall System	Positive Layer? No
Layer # 1	yellow	mastic	*no asbestos detected*		
Layer # 2	off-white	paint	*no asbestos detected*		
Layer # 3	white	texture/joint compound	*no asbestos detected*		
Layer # 4	off-white	paper/cardboard	*no asbestos detected*		
Layer # 5	white	texture/joint compound	*no asbestos detected*		
Layer # 6	tan	paper/cardboard	*no asbestos detected*		
Layer # 7	white	drywall core	*no asbestos detected*		
Sample # **S-SOT-3B**			2017-10203- 5	Wall System	Positive Layer? No
Layer # 1	various	paint	*no asbestos detected*		
Layer # 2	white	texture/joint compound	*no asbestos detected*		
Layer # 3	white	texture/joint compound	*no asbestos detected*		
Sample # **S-SOT-3C**			2017-10203- 6	Wall System	Positive Layer? No
Layer # 1	off-white	paint	*no asbestos detected*		
Layer # 2	white	texture/joint compound	*no asbestos detected*		
Layer # 3	white	texture/joint compound	*no asbestos detected*		
Layer # 4	off-white	paper/cardboard	*no asbestos detected*		
Layer # 5	white	texture/joint compound	*no asbestos detected*		
Layer # 6	tan	paper/cardboard	*no asbestos detected*		
Layer # 7	white	drywall core	*no asbestos detected*		
Sample # **17TEC155-05**			2017-10203- 7	Miscellaneous	Positive Layer? No
Layer # 1	black	debris	*no asbestos detected*		
Layer # 2	gray	debris	*no asbestos detected*		

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

Sample S-TOT-2A **Lab Number** 2017-10203- 1 **Sampled:** 9/29/2017 **Condition:** acceptable

Analyzed By JCJ 10/4/2017 **An?** OK **Apparent Smp Type** Wall System Fibrous Solid

Homogeneous No **# Layers** 4 **Pos Layer?** No

Non-Fibrous Components (in approx. decreasing order): powder, binder, polymer

Layers

#	Layer Type	%	Color	Friability	Percents of Each Fiber: Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	2	off-white	1	n.d.	-	-	-	-	-
2	texture/joint compound	6	off-white	3	n.d.	-	-	-	-	-
3	paper/cardboard	5	tan	2	90-100%	-	-	-	-	-
4	drywall core	87	white	3	<=1%	-	-	-	-	-
	Total %	100		**Overall %**	5-10%	-	-	-	-	-
				Fiber identification:	cellulose fiber					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations: Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose fiber	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of paint matrix using solvent. Procedure: dissolution of joint compound/texture matrix using acid.

Sample S-TOT-2B **Lab Number** 2017-10203- 2 **Sampled:** 9/29/2017 **Condition:** acceptable

Analyzed By JCJ 10/4/2017 **An?** OK **Apparent Smp Type** Wall System Fibrous Solid

Homogeneous No **# Layers** 4 **Pos Layer?** No

Non-Fibrous Components (in approx. decreasing order): powder, binder, polymer

Layers

#	Layer Type	%	Color	Friability	Percents of Each Fiber: Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	2	off-white	1	n.d.	-	-	-	-	-
2	texture/joint compound	3	off-white	3	n.d.	-	-	-	-	-
3	paper/cardboard	5	tan	2	90-100%	-	-	-	-	-
4	drywall core	90	white	3	<=1%	-	-	-	-	-
	Total %	100		**Overall %**	5-10%	-	-	-	-	-
				Fiber identification:	cellulose fiber					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations: Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose fiber	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of paint matrix using solvent. Procedure: dissolution of joint compound/texture matrix using acid.

Sample S-TOT-2C **Lab Number** 2017-10203- 3 **Sampled:** 9/29/2017 **Condition:** acceptable
Analyzed By JCJ 10/4/2017 **An?** OK **Apparent Smp Type** Wall System Fibrous Solid
Homogeneous No **# Layers** 6 **Pos Layer?** No
Non-Fibrous Components (in approx. decreasing order): powder, binder, polymer

Layers

#	Layer Type	%	Color	Friability	Percents of Each Fiber: Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	2	red	1	n.d.	-	-	-	-	-
2	texture/joint compound	4	white	3	n.d.	-	-	-	-	-
3	paper/cardboard	3	off-white	2	90-100%	-	-	-	-	-
4	texture/joint compound	4	white	3	n.d.	-	-	-	-	-
5	paper/cardboard	5	tan	2	90-100%	-	-	-	-	-
6	drywall core	82	white	3	<=1%	-	-	-	-	-
	Total %	100		**Overall %**	5-10%	-	-	-	-	-
				Fiber Identification:	cellulose fiber					

Fibers

		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations: Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose fiber	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

Sample Analytical Note
Procedure: tweased apart using forceps. Procedure: dissolution of paint matrix using solvent. Procedure: dissolution of joint compound/texture matrix using acid.

Sample S-SOT-3A **Lab Number** 2017-10203- 4 **Sampled:** 9/29/2017 **Condition:** acceptable
Analyzed By JCJ 10/4/2017 **An?** OK **Apparent Smp Type** Wall System Fibrous Solid
Homogeneous No **# Layers** 7 **Pos Layer?** No
Non-Fibrous Components (in approx. decreasing order): powder, binder, polymer

Layers

#	Layer Type	%	Color	Friability	Percents of Each Fiber: Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	mastic	1	yellow	1	n.d.	-	-	-	-	-
2	paint	2	off-white	1	n.d.	-	-	-	-	-
3	texture/joint compound	4	white	3	n.d.	-	-	-	-	-
4	paper/cardboard	3	off-white	2	90-100%	-	-	-	-	-
5	texture/joint compound	3	white	3	n.d.	-	-	-	-	-
6	paper/cardboard	5	tan	2	90-100%	-	-	-	-	-
7	drywall core	82	white	3	<=1%	-	-	-	-	-
	Total %	100		**Overall %**	5-10%	-	-	-	-	-
				Fiber Identification:	cellulose fiber					

Fibers

		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations: Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose fiber	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

Sample Analytical Note
Procedure: tweased apart using forceps. Procedure: dissolution of paint matrix using solvent. Procedure: dissolution of joint compound/texture matrix using acid.

Sample S-SOT-3B **Lab Number** 2017-10203- 5 **Sampled:** 9/29/2017 **Condition:** acceptable
Analyzed By JCJ 10/4/2017 **An?** OK **Apparent Smp Type** Wall System Non-fibrous Solid
Homogeneous No **# Layers** 3 **Pos Layer?** No
Non-Fibrous Components (in approx. decreasing order): powder, polymer, filler

Layers

#	Layer Type	%	Color	Friability	Percents of Each Fiber: Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	5	various	1	n.d.	-	-	-	-	-
2	texture/joint compound	15	white	3	n.d.	-	-	-	-	-
3	texture/joint compound	80	white	3	n.d.	-	-	-	-	-
	Total %	100		**Overall %**	n.d.	-	-	-	-	-
				Fiber identification:	none					

Fibers

		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations: Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
Procedure: tweased apart using forceps. Procedure: dissolution of paint matrix using solvent. Procedure: dissolution of joint compound/texture matrix using acid.

Sample S-SOT-3C **Lab Number** 2017-10203- 6 **Sampled:** 9/29/2017 **Condition:** acceptable
Analyzed By JCJ 10/4/2017 **An?** OK **Apparent Smp Type** Wall System Fibrous Solid
Homogeneous No **# Layers** 7 **Pos Layer?** No
Non-Fibrous Components (in approx. decreasing order): powder, binder, polymer

Layers

#	Layer Type	%	Color	Friability	Percents of Each Fiber: Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	2	off-white	1	n.d.	-	-	-	-	-
2	texture/joint compound	2	white	3	n.d.	-	-	-	-	-
3	texture/joint compound	9	white	3	n.d.	-	-	-	-	-
4	paper/cardboard	3	off-white	2	90-100%	-	-	-	-	-
5	texture/joint compound	4	white	3	n.d.	-	-	-	-	-
6	paper/cardboard	5	tan	2	90-100%	-	-	-	-	-
7	drywall core	75	white	3	<=1%	-	-	-	-	-
	Total %	100		**Overall %**	5-10%	-	-	-	-	-
				Fiber identification:	cellulose fiber					

Fibers

		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations: Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose fiber	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

Sample Analytical Note
Procedure: tweased apart using forceps. Procedure: dissolution of paint matrix using solvent. Procedure: dissolution of joint compound/texture matrix using acid.

PLM Analysis Details **Job Number:** **201710203** Sedona Sinagua Building

Sample 17TEC155-05 **Lab Number** 2017-10203- 7 **Sampled:** 9/29/2017 **Condition:** acceptable

Analyzed By JCJ 10/4/2017 **An?** OK **Apparent Smp Type** Miscellaneous Fibrous Mat

Homogeneous No **# Layers** 2 **Pos Layer?** No

Non-Fibrous Components (in approx. decreasing order): powder, binder,

Layers

#	Layer Type	%	Color	Friability	Percents of Each Fiber					
					Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	debris	50	black	3	40-50%	5-10%	-	-	-	-
2	debris	50	gray	3	n.d.	90-100%	-	-	-	-
	Total %	100		**Overall %**	20-30%	50-60%	-	-	-	-
				Fiber Identification:	cellulose fiber	glass fiber				

Fibers

		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations: Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose fiber	W	F	N	N	H	+	U					
2	glass fiber	CL	D	Y									
3													
4													
5													
6													

Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends; D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow; vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber

Analyst: JASON C. JESSNAR

Printed: 04-Oct-17

Original Print Date: 04-Oct-17

Larry S. Pierce, Approved Accreditation Signatory

5025 S. 33rd Street Phoenix, Arizona 85040-2816 Phone: 602-276-6139 1-800-743-2687 FAX: 602-276-4558

Fiberquant, Inc.

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02

CAL 17106331

Originator:
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10 WEST DALE AVENUE
FLAGSTAFF, AZ 86001
(928) 774-0060 (FAX) 774-0051

ASBESTOS CHAIN-OF-CUSTODY

Laboratory:
CRISP ANALYTICAL LABS, LLC
1929 OLD DENTON ROAD
CARROLLTON, TEXAS 75006
(972) 488-1414 (FAX) 488-8006

JOB NO.: 17EC155.ASM
PROJECT NAME: Sedona Sinsced Building
CLIENT/COMPANY: City of Sedona c/o Tallpines
SAMPLER (SIGNATURE): J. Sulfred
SAMPLER (PLEASE PRINT): J. Sulfred

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE LOCATION	FRIABLE (Y/N)	BULK	WIPE	PERSONAL AIR	INSIDE/OUTSIDE AREA AIR	FINAL CLEARANCE	ANALYSIS METHOD PLM	PCM	TEM	TOTAL VOLUME (LITERS)	HOMOGENEOUS AREA DESCRIPTION
M-ACT-1A	9/29/17	12:45	Court room, SE ceiling	Y	X					X				white paint / 12"x12" gray acoustical
-1B		12:50	Restroom hall, west ceiling	Y	X					X				ceiling tile / brown mastic
-1C		12:55	Court room, west soffit	Y	X					X				white paint / 12"x12" acoustical tile / tan adhesive
M-CPT-4A		1:06	Jury room, north floor	N	X					X				textured green berber carpet / tan mastic
-4B		1:13	Break room, south floor	N	X					X				tan adhesive
-4C		1:18	Court Admin office, NE floor	N	X					X				
M-LIN-5A		1:20	Men's RR, SE floor	Y	X					X				rock patterned linoleum / paper backing
-5B		1:25	Women's RR, SE floor	Y	X					X				tan adhesive
-5C		1:28	Jury RR, south floor	Y	X					X				
M-COV-6A		1:30	Jury RR, east wall	N	X					X				4" gray rubber cove base / tan adhesive
-6B		1:32	Men's RR, SW wall	N	X					X				
-6C		1:34	Women's RR, SW wall	N	X					X				
M-FOR-7A		1:37	Utility/storage - so. counter	N	X					X				speckled pink formica counter top /
-7B		1:40	Break room, so. counter	N	X					X				orange adhesive
-7C		1:42	IT Room, so. counter	N	X					X				
M-STU-8A		2:40	Ext. sidewalk perimeter wall	N	X					X				paint / exterior stucco / concrete
-8B		2:42	Jury room, ext. perimeter wall	N	X					X				
-8C	↓	2:45	EXT. SE perimeter wall	N	X					X				

RELINQUISHED BY (SIGNATURE): J. Sulfred — DATE: 10/2/17 — TIME: Noon
RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):
DATE: TIME: RECEIVED BY (SIGNATURE):
Fed Ex 8056-1801-6395
RECEIVED FOR LABORATORY BY (SIGNATURE):
DATE: 10/3/17 TIME: 10:30

SAMPLE PROCESS TURNAROUND TIME
☐ RUSH 4 HOURS ☒ 2 DAYS ☐ 5 DAYS

CAL17106331

03

Originator:
TALLPINES ENVIRONMENTAL CONSULTING CO.
10 WEST DALE AVENUE
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ASBESTOS CHAIN-OF-CUSTODY

Laboratory:
CRISP ANALYTICAL LABS, LLC
1929 OLD DENTON ROAD
CARROLLTON, TEXAS 75006
(972) 242-2754 (FAX) 488-8006

JOB NO.: 17EC155, ASM
PROJECT NAME: Sedona Shrouud Building
CLIENT/COMPANY: City of Sedona c/o Tallpines Environmental
SAMPLER (SIGNATURE): P. Luffrell
SAMPLER (PLEASE PRINT): P. Luffrell

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE LOCATION	FRIABLE (Y/N)	SAMPLE METHOD: BULK	WIPE	PERSONAL AIR	INSIDE/OUTSIDE AREA AIR	FINAL CLEARANCE	ANALYSIS METHOD: PLM	PCM	TEM	TOTAL VOLUME (LITERS)	HOMOGENEOUS AREA DESCRIPTION
M-ARS-9A	9/29	F 3pm	Front canopy roof, SW corner	N	X					X				(green asphaltic roof shingles/ blac
-9B		3:03	Main roof, SW side	N	X					X				tar/ black felt
-9C		3:06	" , south side	N	X					X				
M-CPT-10A		1:47	Utility closet, north floor	N	X					X				(beige berber carpet/ net (tan adhesive
-10B		1:51	" , north floor	N	X					X				
-10C		1:55	" , NW floor	N	X					X				

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)
P. Luffrell	10/2/17	10am					
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE	TIME	SAMPLE PROCESS TURNAROUND TIME	
FedEx 8055-1801-6395			[illegible]	10/3/17	10:30	☐ RUSH 4 HOURS ☒ 3 DAYS ☐ 5 DAYS	

CA Labs
Dedicated to Quality

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Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Tallpines Environmental Consulting Co.
10 West Dale Avenue
Flagstaff, AZ 86001

Attn: Patty Luttrell
Customer Project: RE:CAL17106331AG, 17TEC155.ASM, Sedona Sina
Reference #: CAL17106331Amende Date: 10/9/2017

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be delectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all Initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
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Overview of Project Sample Material Containing Asbestos

Customer Project: RE:CAL17106331AG, 17TEC155.ASM, Sedona Sina **CA Labs Project #:** CAL17106331AmendedAF

Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestas fibers and non-fibrous minerals):

ca - carbonate	pe - perlite	fg - fiberglass	pa - palygorskite (clay)
gypsum - gypsum	qu - quartz	mw - mineral wool	
bi - binder		wo - wollastinite	
or - organic		ta - talc	
ma - matrix		sy - synthetic	
mi - mica		ce - cellulose	
ve - vermiculite		br - brucite	
ot - other		ka - kaolin (clay)	

CA Labs
Dedicated to Quality

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Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Patty Luttrell
Tallpines Environmental Consulting Co.
10 West Dale Avenue
Flagstaff, AZ 86001

Phone # 928-774-0060
Fax # 928-774-0051

Customer Project:
RE:CAL17106331AG, 17TEC155.ASM, Sedona Sinagua Bldg.
Turnaround Time:
3 days

CA Labs Project #:
CAL17106331AmendedAF

Date: 10/9/2017
Samples Received: 10/3/17 10:30AM
Date Of Sampling: 9/29/2017
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
M-ACT-1A		M-ACT-1A-t	***Courtroom, SE Ceiling/White Paint/ 12"x12" Gray Acoustical/*** *white surfaced white ceiling tile*	*n*	***None Detected***	71% fg	29% qu,pe,ot
		M-ACT-1A-2	*brown mastic*	*y*	***None Detected***		100% qu,gy,bi
M-ACT-1B		M-ACT-1B-1	***Restroom Hall, West Ceiling/ Ceiling Tile/Brown Mastic/*** *white surfaced white ceiling tile*	*n*	***None Detected***	72% fg	28% qu,pe,ot
		M-ACT-1B-2	*brown mastic*	*y*	***None Detected***		100% qu,gy,bi
M-ACT-1C		M-ACT-1C-t	***Courtroom, West Soffit/ White Paint/ 12"x12" Acoustical Tile/Tan Adhesive/*** *white surfaced white ceiling tile*	*n*	***None Detected***	73% fg	27% qu,pe,ot
		M-ACT-1C-2	*white covering*	*y*	***None Detected***		100% qu,gy,bi
M-CPT-4A		M-CPT-4A-t	***Jury Room, North Floor/Textured Green Berber Carpet/ Tan Net/*** *gray carpeting*	*y*	***None Detected***	100% sy	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Analyst/Lab Supervisor Tanner Rasmussen

Technical Manager Chad Lytle

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10. TEM analysis suggested

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Patty Luttrell
Tallpines Environmental Consulting Co.
10 West Dale Avenue
Flagstaff, AZ 86001

Phone # 928-774-0060
Fax # 928-774-0051

Customer Project:
RE:CAL17106331AG, 17TEC155.ASM, Sedona Sinagua Bldg.
Turnaround Time:
3 days

CA Labs Project #:
CAL17106331AmendedAF

Date: 10/9/2017
Samples Received: 10/3/17 10:30AM
Date Of Sampling: 9/29/2017
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
		M-CPT-4A-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-CPT-4B		*M-CPT-4B-1*	***Breakroom, South Floor/ Tan Adhesive/*** *gray carpeting*	*y*	***None Detected***	100% sy	
		M-CPT-4B-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-CPT-4C		*M-CPT-4C-1*	***Court/Admin Office, NE Floor/ Tan Adhesive/*** *gray carpeting*	*y*	***None Detected***	100% sy	
		M-CPT-4C-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-LIN-5A		*M-LIN-5A-1*	***Men's RR, SE Floor/ Rock Patterned Linoleum/Paper Backing/*** *gray linoleum*	*y*	***None Detected***	21% ce	79% qu,ma
M-LIN-5B		*M-LIN-5B-1*	***Women's RR, SE Floor/ Tan Adhesive/*** *gray linoleum*	*y*	***None Detected***	22% ce	78% qu,ma

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Analyst/Lab Supervisor
Tanner Rasmussen

Technical Manager
Chad Lytle

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CAL17106331AmendedAF

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Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
		M-LIN-5B-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-LIN-5C		*M-LIN-5C-1*	***Jury RR, South Floor/ Tan Adhesive/*** *gray linoleum*	*y*	***None Detected***	24% ce	76% qu,ma
M-COV-6A		*M-COV-6A-1*	***Jury RR, East Wall/ 4" Gray Rubber Covebase/Tan Adhesive/*** *gray baseboard*	*y*	***None Detected***		100% qu,ma
		M-COV-6A-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-COV-6B		*M-COV-6B-1*	***Men's RR, SW Wall/ 4" Gray Rubber Covebase/Tan Adhesive/*** *gray baseboard*	*y*	***None Detected***		100% qu,ma
		M-COV-6B-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-COV-6C		*M-COV-6C-1*	***Women's RR, SW Wall/ 4" Gray Rubber Covebase/Tan Adhesive/*** *gray baseboard*	*y*	***None Detected***		100% qu,ma

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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bi - binder	ot -other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Analyst/Lab Supervisor Tanner Rasmussen

Technical Manager Chad Lytle

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CA Labs Project #:
CAL17106331AmendedAF

Date: 10/9/2017
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Date Of Sampling: 9/29/2017
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
		M-COV-6C-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-FOR-7A		*M-FOR-7A-1*	***Utility/Storage - SO, Counter/ Speckled Pink Formica Counter Top/*** *off-white countertop*	*y*	***None Detected***		100% qu,ma
		M-FOR-7A-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-FOR-7B		*M-FOR-7B-1*	***Breakroom, SO, Counter/Orange Adhesive/*** *off-white countertop*	*y*	***None Detected***		100% qu,ma
		M-FOR-7B-2	*tan mastic*	*y*	***None Detected***		100% gy,bi
M-FOR-7C		*M-FOR-7C-1*	***IT Room, SO, Counter/Orange Adhesive/*** *off-white countertop*	*y*	***None Detected***		100% qu,ma
		M-FOR-7C-2	*tan mastic*	*y*	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM *TCEQ# T104704513-15-3* *TDH 30-0235*

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Analyst/Lab Supervisor
Tanner Rasmussen

Technical Manager
Chad Lytle

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Polarized Light Asbestiform Materials Characterization

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3 days

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CAL17106331AmendedAF

Date: 10/9/2017
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Date Of Sampling: 9/29/2017
Purchase Order #:

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
M-STU-8A		M-STU-8A-1	***Ext. Sidewalk Perimeter Wall/ Paint/Exterior Stucco/Concrete/*** *tan stucco*	y	***None Detected***		100% qu,bi,ca
M-STU-8B		M-STU-8B-1	***Jury Room, Ext. Perimeter Wall/ Paint/Exterior Stucco/Concrete/*** *tan stucco*	y	***None Detected***		100% qu,bi,ca
M-STU-8C		M-STU-8C-1	***Ext. SE Perimeter Wall/ Paint/Exterior Stucco/Concrete/*** *tan stucco*	y	***None Detected***		100% qu,bi,ca
M-ARS-9A		M-ARS-9A-1	***Front Canopy Roof, SW Corner/ Green Asphaltic Roof Shingles/Black/*** *black roofing shingle with gray gravel*	n	***None Detected***	21% fg	79% gy,bi
		M-ARS-9A-2	*black tar*	y	***None Detected***		100% gy,bi
M-ARS-9B		M-ARS-9B-1	***Main Roof, SW Side/Tar/Black Felt/*** *black roofing shingle with gray gravel*	n	***None Detected***	20% fg	80% gy,bi
		M-ARS-9B-2	*black tar*	y	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
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M-ARS-9C		M-ARS-9C-1	***Main Roof, South Side/Tar/Black Felt/*** *black roofing shingle with gray gravel*	n	***None Detected***	21% fg	79% gy,bi
		M-ARS-9C-2	*black tar*	y	***None Detected***		100% gy,bi
M-CPT-10A		M-CPT-10A-1	***Utility/Storage, North Floor/ Beige Berber Carpet/Net/Tan Adhesive/*** *white carpeting*	y	***None Detected***	100% sy	
		M-CPT-10A-2	*tan mastic*	y	***None Detected***		100% gy,bi
M-CPT-10B		M-CPT-10B-1	***Utility/Storage, North Floor/ Beige Berber Carpet/Net/Tan Adhesive/*** *white carpeting*	y	***None Detected***	100% sy	
		M-CPT-10B-2	*tan mastic*	y	***None Detected***		100% gy,bi
M-CPT-10C		M-CPT-10C-1	***Utility/Storage, NW Floor/ Beige Berber Carpet/Net/Tan Adhesive/*** *white carpeting*	y	***None Detected***	100% sy	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

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		M-CPT-10C-2	*tan mastic*	*y*	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

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American Council for Accredited Certification

hereby certifies that

Patty Rubick Luttrell

has met all the specific standards and qualifications of the re-certification process, including continued professional development, and is hereby re-certified as a

CMC

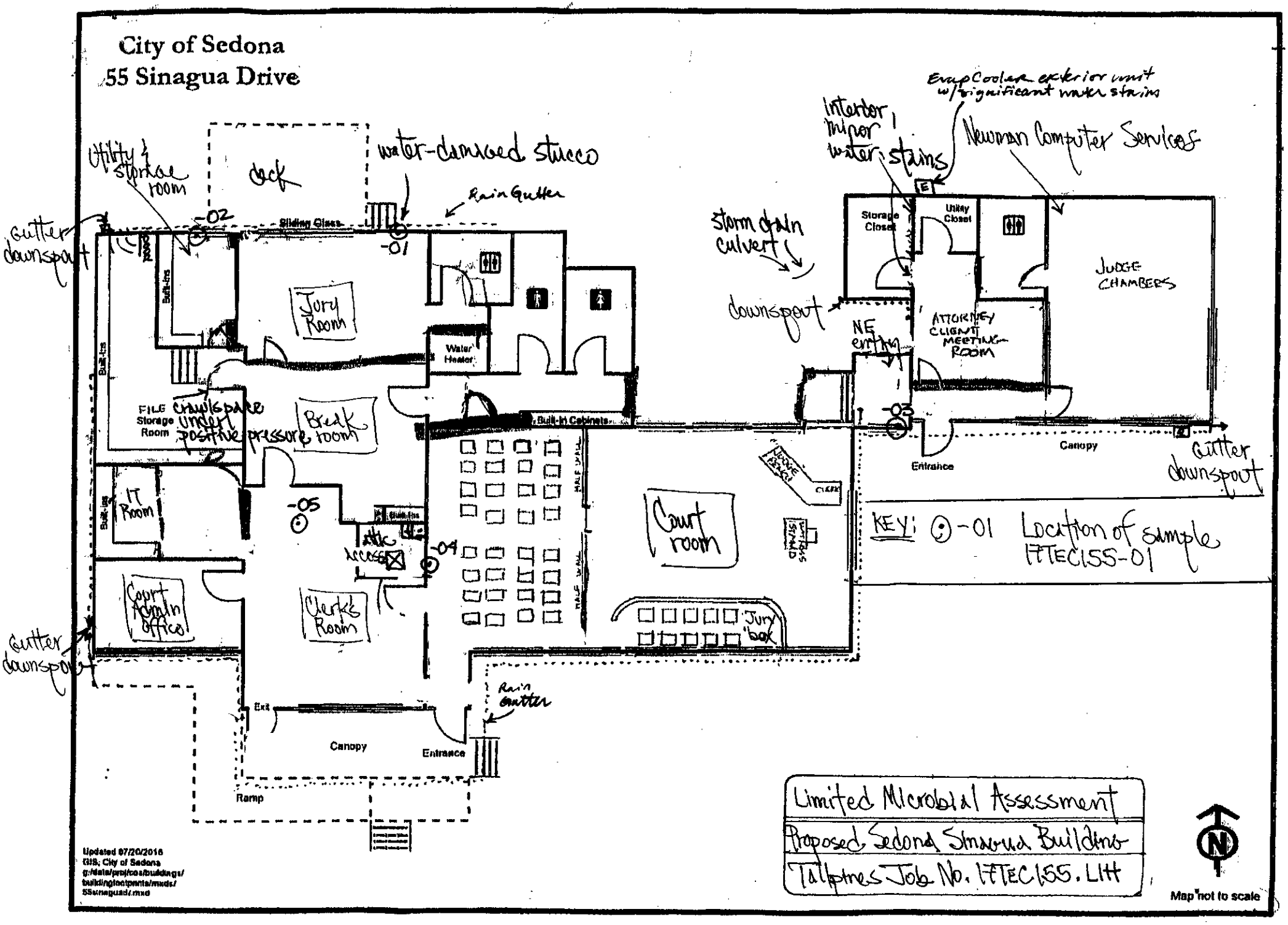
Council-certified Microbial Consultant

This certificate expires on May 31, 2018.

Charles F. Wiles, Executive Director

0606002

Certificate Number


City of Sedona
55 Sinagua Drive
Utility storage room
deck
water-damaged stucco
Rain Gutter
Gutter downspout
-02
-01
Sliding Glass
Built-ins
Jury Room
Water Heater
Storm drain culvert
downspout
Evap Cooler exterior unit w/ significant water stains
Interior minor water stains
Newman Computer Services
Storage Closet
Utility Closet
JUDGE CHAMBERS
ATTORNEY CLIENT MEETING ROOM
NE entry
-03
Canopy
Entrance
Gutter downspout
FILE Storage Room
crawlspace under positive pressure
Break room
Built-in Cabinets
IT Room
-05
attic access
-04
Court Admin Office
Clerks Room
Court room
JUDGE'S BENCH
CLERK
WITNESS STAND
HALF WALL
Jury box
Gutter downspout
Rain Gutter
Exit
Canopy
Entrance
Ramp
KEY: -01 Location of sample 17TEC155-01
Limited Microbial Assessment
Proposed Sedona Sinagua Building
Tallgrass Job No. 17TEC155.LIM
Updated 07/20/2016
GIS, City of Sedona
g:/data/projects/buildings/buildingfootprints/mxds/55sinaguad.mxd
Map not to scale

(01)

TALLPINES' SAMPLING DATA SHEET

Client: City of Sedona
Project: Limited indoor microbial assessment
Job No.: 17TEC155.ASM
Location: 55 Sinagua Drive, Sedona
Date: 09/29/17 Friday

Sample Number	Sample Type/ Activity	Pump No.	Location (pump and/or bulk samples)	Complaint/ Noncompl	Time On	Time Off	Total Time (Min)	Initial* Flow Rate (Lpm)	Final* Flow Rate (Lpm)	Ave. Flow Rate (Lpm)	Vol. (L) or (cm^2)
17TEC155-01	ST/WC	BPP	p Jury Room, N wall cavity	C	3:34	3:36	2:00	15.21	15.01	15.11	30.22L
17TEC155-02	ST/WC	BPP	p Utility/Storage Room, N wall cavity under window/A/C unit	C	3:50	3:52	2:00	15.22	15.18	15.20	30.40L
17TEC155-03	ST/WC	BPP	p Entrance Hallway; SE corner under oval window.	C	4:03	4:05	2:00	15.16	15.20	15.18	30.36L
17TEC155-04	SW	SW	p Courtroom, W. wall, inside Return air vent.	C	4:15	—	—	—	—	—	1cm²
17TEC155-05*											
			Sample -05, dust from a fiberglass-lined duct, was shipped to Fiberquant Analytical for analysis.								

Sampled by: R. Luttrell
Signature: R. Luttrell

SAMPLE TYPE: OA = Outdoor ambient air, WC = WallChek, ST = Spore trap, SW = Swab, IMP = Impactor/viable, CL = Clearances
OB = Optical borescope, CPT = CarpetChek, B = Bulk, BL = Baseline, BK = Background, NC = Noncomplaint area, C = Complaint area

* Flow rates are from a Bio-Pump Plus (BPP) using a TSI primary calibrator

CHAIN OF CUSTODY

www.EMLabPK.com

EMLab P&K
A TestAmerica Company

New Jersey: 3000 Lincoln Drive East, Suite A, Marlton, NJ 08053 * (866) 871-1984
Phoenix, AZ: 1501 West Knudsen drive, Phoenix, AZ 85027 * (800) 651-4802
San Bruno, CA: 1150 Bayhill Drive, #100, San Bruno, CA 94066 * (866) 888-6653

Weather		Fog	Rain	Snow	Wind	Clear
Level	None	☒	☒	☒ (OK)	☐	☐
	Light	☐	☐	☐	☒	
	Moderate	☐	☐	☐	☐	
	Heavy	☐	☐	☐	☐	

REQUESTED (Use checkbo…

001805977

[redacted]NTACT INFORMATION

Compan[redacted]	Address:
Contact[redacted]	Special Instructions:
Phone: TALLPINES ENVIRONMENTAL 10 W. Dale Avenue Flagstaff, AZ 86001	

PROJECT INFORMATION

Project ID:	17TEC155.LIH		
Project Description:	Sedona Sinagua building		
Project Zip Code:	86336	Sampling Date & Time:	09/29/17
PO Number:	——	Sampled By:	P. Luttrell

TURN AROUND TIME CODES (TAT)

- **STD** – Standard (DEFAULT) (circled)
- **ND** – Next Business Day
- **SD** – Same Business Day Rush
- **WH** – Weekend / Holiday

Rushes received after 2 pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume / Area (if applicable)	Notes (Time of day, Temp, RH, etc.)	Fungi – Spore Trap Analysis	Quantitative Spore Count Direct Exam
17TEC155-01	Jury room, NE wall cavity	ST/WC	Std	30.22L	3:36pm	☒	☐
-02	Utility storage, N wall cavity	↓	↓	30.40L	3:57	☒	☐
-03	Court room NE wall, SE (↓)	↓	↓	30.36L	4:05	☒	☐
-04	Court room, return air duct	SW	↓	1cm²	4:15	☐	☒

FedEx: 811077512887

Requested analyses (column headings): Non-Culturable: Spore Trap; Tape / Swab / Bulk. Culturable: BioCassette™, Anders…, Water, Bulk, Dust, Soil, Contact Plates.
Fungi – Spore Trap Analysis; Spore Trap Analysis – Other particles; Direct Microscopic Exam (Qualitative); Quantitative Spore Count Direct Exam; 1-Media Surface Fungi (Genus ID + Asp. spp.); 2-Media Surface Fungi (Genus ID + Asp. spp.); 3-Media Surface Fungi (Genus ID + Asp. spp.); Culturable Air Fungi (Genus ID + Asp. spp.); Gram Stain & Counts (Culturable Air & Surface Bacteria); Legionella culture; Total Coliform, E. coli (Presence/Absence); Membrane Filtration (specify organism); MPN Bacteria (specify organism); QuantiTray – Sewage Screen; Asbestos Analysis – PCM Airborne Fiber Count (NIOSH 7400); Asbestos Analysis – PLM (EPA method 600/R-93-116); PCR (specify test):

SAMPLE TYPE CODES			
BC – BioCassette™	ST – Spore Trap: Zefon, Allergenco, Burkard …	T – Tape	D – Dust
A1S – Anderson		SW – Swab	SO – Soil
SAS – Surface Air Sampler	P – Potable Water	B – Bulk	WC = Wall Cavity
CP – Contact Plate	NP – Non-Potable Water	O – Other:	

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
P. Luttrell	10/02/17 10 am	FedEx	
FedEx	10/3/1	[signature]	10/3/1 09A

EMLab P&K
A TestAmerica Company

Report for:

Patty Luttrell
Tailpines Environmental
10 W. Dale Avenue
Flagstaff, AZ 86001

Regarding: Project: 17TEC155.LIH; Sedona Sinagua Building
EML ID: 1805977

Approved by:

Joshua T. Cox

Operations Manager
Joshua Cox

Dates of Analysis:
Spore trap analysis: 10-05-2017

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #102297

EMLab P&K
1501 West Knudsen Drive, Phoenix, AZ 85027
(800) 651-4802 Fax (623) 780-7695 www.emlab.com

Client: Tallpines Environmental
C/O: Patty Luttrell
Re: 17TEC155.LIH; Sedona Sinagua Building

Date of Sampling: 09-29-2017
Date of Receipt: 10-03-2017
Date of Report: 10-05-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	17TEC155-01: Jury Room, NE Wall Cavity				17TEC155-02: Utility/Storage, N (Wall Cavity)				17TEC155-03: Courtroom NE Hall, SE (Wall Cavity)			
Comments (see below)	None				None				None			
Lab ID-Version‡:	8451849-1				8451850-1				8451851-1			
Analysis Date:	10/05/2017				10/05/2017				10/05/2017			
Sample volume (liters)	30.22				30.4				30.36			
Background debris (1-4+)††	4+				3+				2+			
	raw ct.	Count/m3	DL/m3*	%	raw ct.	Count/m3	DL/m3*	%	raw ct.	Count/m3	DL/m3*	%
Hyphal fragments	15	500	33	n/a	2	66	33	n/a	9	300	33	n/a
Pollen	1	33	33	n/a								
§ TOTAL FUNGAL SPORES	31	2,600	n/a	100	105	14,000	n/a	100	40	5,300	n/a	100
Altemaria	1	33	33	1								
Ascospores	1	130	130	5					1	130	130	3
Basidiospores	2	260	130	10	1	130	130	1	1	130	130	3
• Chaetomium	10	330	33	13								
Cladosporium									3	400	130	8
• Penicillium/Aspergillus types	13	1,700	130	66	104	14,000	130	99	35	4,600	130	88
Smuts, Periconia, Myxomycetes	1	33	33	1								
• Stachybotrys	3	99	33	4								
Stemphylium												
Torula												
Ulocladium												
Zygomycetes												

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.

The analytical sensitivity/limit of detection is the Count/m^3 divided by the raw count, expressed in Count/m^3.

*The detection limit/limit of detection (DL) per cubic meter (m3) has been rounded to two significant figures to reflect analytical precision.

††Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Fungal Spores has been rounded to two significant figures to reflect analytical precision.

EMLab P&K
A TestAmerica Company

Report for:

Patty Luttrell
Tallpines Environmental
10 W. Dale Avenue
Flagstaff, AZ 86001

Regarding: Project: 17TEC155.LIH; Sedona Sinagua Building
EML ID: 1805977

Approved by:

Joshua T. Cox

Operations Manager
Joshua Cox

Dates of Analysis:
Quantitative spore count direct exam: 10-05-2017

Service SOPs: Quantitative spore count direct exam (EM-MY-S-1041)
AIHA-LAP, LLC accredited service, Lab ID #102297

EMLab P&K
1501 West Knudsen Drive, Phoenix, AZ 85027
(800) 651-4802 Fax (623) 780-7695 www.emlab.com

Client: Tallpines Environmental
C/O: Patty Luttrell
Re: 17TEC155.LIH; Sedona Sinagua Building

Date of Sampling: 09-29-2017
Date of Receipt: 10-03-2017
Date of Report: 10-05-2017

QUANTITATIVE SPORE COUNT REPORT

Location:	17TEC155-04: Courtroom,Return Air Duct			
Comments (see below)	None			
Sample type	Swab sample			
Lab ID-Version‡:	8451848-1			
Analysis Date:	10/05/2017			
Background debris (1-4+)	3+			
Sample size	1 cm2			
Reporting unit	1 cm2			
	Count	Count/sample	Count/unit	%
Hyphal fragments		< 40	< 40	n/a
§ TOTAL FUNGAL SPORES	18	1,400	1,400	100
Alternaria	2	150	150	11
Ascospores	1	77	77	6
Cladosporium	2	150	150	11
Epicoccum	3	230	230	17
Myrothecium				
Nigrospora				
Other brown	4	310	310	22
Other colorless				
Penicillium/Aspergillus types	1	77	77	6
Pithomyces				
Rusts				
Smuts, Periconia, Myxomycetes	4	310	310	22
Stachybotrys	1	77	77	6
Stemphylium				
Torula				
Ulocladium				
Zygomycetes				

Comments:

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Fungal Spores has been rounded to two significant figures to reflect analytical precision.
Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.

The limit of detection is 1 spore per area analyzed.
The analytical sensitivity is (1 Spore/Total Number of Fields Observed)*(Total Sample Area(cm2)/Field Area of the microscope objective (cm2))*(1/unit volume)*Dilution Factor.
For more information regarding analytical sensitivity, please contact QA by calling the laboratory.

This cover letter and accompanying pages are an integral part of this report. All analyses are performed in our AIHA and EMLAP accredited laboratory. The data generated in this report are based on the samples and accompanying information provided and represent concentrations at a point in time under the conditions sampled. Results can vary with site conditions. EMLab P&K employees did not collect samples for this project, may provide only limited interpretation of this data as it relates to the overall investigation.

Quality Assurance

EMLab P&K is staffed with highly trained professionals, including PhD's, chemists, and registered microbiologists with over 40 years of experience. The reliability of test results depends on many factors such as the personnel performing the tests, environmental conditions, selection and validation of test methods, equipment functioning, measurement traceability, as well as the sampling, storage and handling of test items, all of which are a reflection of the laboratories overall quality system.

EMLab P&K has modeled its quality system after ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories, one of the most stringent sets of standards in the industry, to ensure that its customers receive the high standard of accuracy, reliability, and impartiality that they have come to expect from a leader in the environmental industry. EMLab P&K's adherence to the standards set forth in ISO 17025 has been validated and formally recognized through accreditations granted by an independent outside agency, American Industrial Hygiene Association (AIHA). As an additional measure to demonstrate its competency to perform the analyses it offers to its competency to perform the analyses it offers to its clients, EMLab P&K also participates in a variety of different proficiency testing programs, including the Environmental Microbiology Proficiency Analytical Testing Program (EMPAT) sponsored by the American Industrial Hygiene Association.

As part of its continuous commitment to excellence, EMLab P&K is also inspected, licensed and/or accredited by a number of governmental agencies and independent associations in addition to those already mentioned above. The scope document, accreditation certificates, and proficiency results can all be accessed at www.emlab.com. Below you will find additional information regarding the specific analyses requested for this project.

Comments

The comments identify issues or events that are relevant to your analytical results. A comment includes information about the validity, the source of the data whether calculated, entered or estimated, and the value of an observation. In each case the comments provide significant information vital to the interpretation of the laboratory data.

For additional information, or if you have any questions regarding this report, please do not hesitate to call.

Analytical References

Medically Important Fungi: A Guide to Identification, 3rd ed., ASM, 1995.
Standard Methods for the Examination of Water and Wastewater, 19th ed., APHA, 1995.
Sampling and Identifying Allergenic Pollens and Molds, Blewstone, 1990.
Identifying Filamentous Fungi: A Clinical Laboratory Handbook, Star, 1996.
Manual of Clinical Microbiology, 7th ed., ASM, 1999.
A Laboratory Guide to Common *Aspergillus* Species and their Teleomorphs, CSIRO, 1994.
Bioaerosols: Assessment and Control, ACGIH, 1999.

Aerotech Laboratories, Inc.

AIHA Accredited

OverviewOfMold

Mold

Mold is an all-encompassing term to describe the growths such as fungi, mushrooms, rusts, mildew, and yeast. Molds are eukaryotic organisms (have a defined nucleus) that lack flagella and reproduce by means of spores. There are only a few places on earth that are uninhabitable by mold. As an expected part of the environment, they are present almost everywhere and vary naturally in genera and concentrations based upon geographic locations and seasonal conditions.

There are an estimated 100,000 accurately described species of fungi and at least as many species waiting to be discovered. Almost all of these fungi are aerobes meaning they require oxygen to survive. They do not ingest their food but rather absorb nutrients by attacking dead organic matter or parasitizing living organisms. Many live in the soil and take an active part in the decomposition of organic matter. Unfortunately, many porous building materials such as drywall, wallpaper, and insulation are either constructed of, or contain some type of organic material.

When building components become moist from flooding or excessive humidity the fungi will initiate the reproductive phase of their life cycle and produce spores. It is their ability to reproduce very rapidly through these spores that make them thrive virtually anywhere. As long as moisture is present, microbial growth will continue unchecked until the moisture and/or nutrient sources are removed.

OverviewOfMold

Continued...

Certain fungi or fungal products (i.e. mycotoxins) can be the primary causes of human disease. Systemic, opportunistic or dermatophytic infections can occur from over 100 species known to affect humans. However, the majority of fungi found in the environment are unable to cause infectious disease unless the exposed individual is severely immunocompromised. The most common health effect from exposure to fungi is allergy like symptoms, mucous membrane irritation, headache, fatigue, and cold/flu-like symptoms.

High levels of fungi in an indoor environment as compared to normal outdoor levels are of particular concern. In the event that fungal contamination is determined within a dwelling, a professional investigation is essential to thoroughly evaluate the occupant space and determine appropriate clean-up measures.

References:

Bioaerosols: Assessment and Control; ACGIH, 1999, Chapter 19.

Environmental Microbiology; Academic Press, 2000, Chapter 2.3.

The Fungi, 2nd Edition; Academic Press, 2001.

http://doctorfungus.org

Illustrated Dictionary of Mycology; The American Phytopathological Society; Second Printing, 2001.

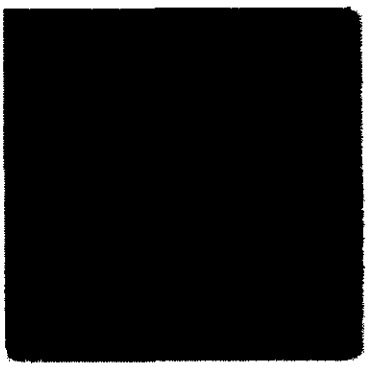
Glossary

Definitions

Chaetomium

Phonetic: Kay-toh'-me-um or Chay-toh'-me-um

Chaetomium is found worldwide on a variety of substrates including paper, damp sheetrock, carpet, plant compost, soil, and between layers of wet plywood. Several species have been reported to play a major role in decomposition of cellulose-based materials, and is often found indoors with *Stachybotrys*. These fungi are able to dissolve the cellulose fibers in cotton and paper and thus cause the materials to disintegrate. The process is especially rapid under moist conditions. During the Second World War, countries lost a great deal of equipment to these species. *Chaetomium* is reported to have type I & III allergens, and can produce sterigmatocystin, a mycotoxin shown to cause kidney and liver damage in laboratory animals. It is not a common human pathogen, but it has been known to cause skin and nail infections. It is an ascomycete, and in most species the spores are lemon-shaped, with a single germ pore. The spore column results from the breakdown of the asci within the body of the perithecium. The perithecia of *Chaetomium* are superficial and barrel-shaped, and they are clothed with dark, stiff hairs. It can produce an *Acremonium*-like state (imperfect stage) on fungal media. Culture - Potato dextrose agar or Malt extract agar, 20° - 25°C, 7 – 10 days.



References: (All); (2); (3); (5); (6); (7); (8); (9); (12); (14); (15); (17); (18); (38);

Type Keywords

Type Keywords

Definitions

Aspergillus

Phonetic: Ass-purr-jill-us

Aspergillus is a common type I & III allergen. They are frequently isolated from forest products, soils, grains, nuts, cotton, organic debris, and water damaged building materials. Spores can also be found in moist ventilation systems and house dust. There are more than 160 different species of *Aspergillus*, sixteen of which have been documented as etiological agents of human disease but rarely occur in individuals with normally functioning immune systems. However, due to the substantial increase in populations of individuals with HIV, chemotherapy patients and those on corticosteroid treatment, contamination of building substrates with fungi, particularly *Aspergillus* is of concern. Aspergillosis is now the second most common fungal infection requiring hospitalization in the United States. Many *Aspergillus* species produce mycotoxins that may be associated with diseases in humans and other animals. Toxin production is dependent on the species or strain within the species and on the food source for the fungus. Some of these toxins are carcinogenic including aflatoxins and ochratoxin. *Aspergillus* is a common cause of extrinsic asthma with symptoms including edema and bronchiospasms, and chronic cases may develop pulmonary emphysema. These fungi are frequently secondary opportunistic pathogens in patients with bronchiectasis, carcinoma, other mycosis, sarcoid, and tuberculosis. Some species can also cause onychomycosis (infection of the nail). (A_w – 0.71 – 0.94). Culture - Potato dextrose agar or Malt extract agar, 20° - 25°C, 7 – 10 days. Speciation of *Aspergillus* requires the culture of the fungus under different conditions of media, humidity, and temperature.

References: (All); (1); (2); (3); (4); (5); (6); (7); (8); (9); (12); (14); (19);

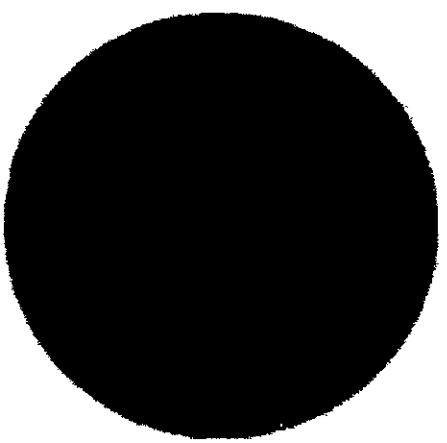
Type Keywords

Definitions

Penicillium

Phonetic: Pen-uh-sill'-ee-um

A large number of organisms belong to this genus, and identification to species is difficult. Often found in aerosol samples, it is common in soil, food, cellulose, paint, grains, and compost piles. In the indoor environment it is in carpet, wallpaper, and in interior fiberglass duct insulation. Although this fungus causes fewer allergies than other molds, Penicillium is reported to be a type I & III allergen. It may cause hypersensitivity pneumonitis and allergic alveolitis in susceptible individuals. It can cause other infections such as keratitis, penicilliosis, and otomycosis. Some species can produce mycotoxins including Ochratoxin, which is damaging to the kidneys and liver and is also a suspected carcinogen; there is also evidence that impairs the immune system. It also produces Citrinin that can cause renal damage, vasodilatation, and bronchial constriction and Gliotoxin, which is immunosuppressive. Patulin is another of its mycotoxins that is believed to cause hemorrhaging in the brain and lungs and is usually associated with apple and grape spoilage. It can also cause extrinsic asthma. P. camemberti has been responsible for inducing occupational allergies among those who work with soft white cheeses on which the fungus grows (cheese washer's lung). *P. marneffei* is the major pathogenic species causing infections of the lymphatic system, lungs, liver, skin, spleen, and bone, and is also the only species of the genus to have a yeast-like phase induced by temperature. *Penicillium sp.* are recognized by their dense brush-like spore-bearing structures. (A_w -0.78-0.86). Culture - Potato dextrose agar or Malt extract agar, 20° – 25°C, 7 – 10 days.



References: (28); (32); (34); (35); (38); (120);

Find Keywords

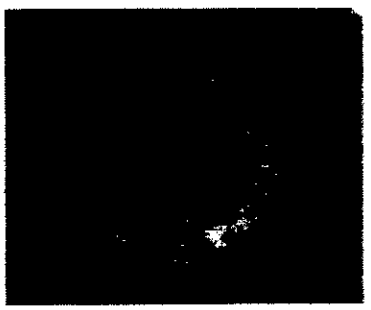
Glossary

Definitions

Stachybotrys

Phonetic: Stack-ee-bought-riss

Stachybotrys is commonly found in sub-tropical to tropical areas in soil and decaying plant materials, and is considered a type I & III allergen. Considerable recent media attention has been focused on the fungi *Stachybotrys chartarum (atra)* due to infant deaths in Cleveland from pulmonary hemosiderosis, which may be associated with contamination of residences with this fungus. *Stachybotrys* thrives on water damaged cellulose rich materials such as sheet rock, paper, ceiling tiles, cellulose containing insulation backing and wallpaper. The presence of this fungus in buildings is significant because of the mold's ability to produce mycotoxins, such as Satratoxin H, Trichoverrol, and Cyclosporins that possess cytotoxic, immunological, carcinogenic effects. Exposure to these toxins can occur through inhalation, ingestion or dermal exposure. Symptoms include dermatitis, cough, rhinitis, nose bleeds, a burning sensation in the mouth and nasal passage, cold and flu symptoms, headache, general malaise, and fever. Inhalation of conidia may also induce pathological changes (pneumomycotoxicoses). Satratoxin H has been reported to be abortogenic in animals and in high doses or chronic low doses it can be lethal. *S. chartarum (atra)* produces other macrocyclic and trichoverroid trichothecenes and, like *Memnoniella echinata*, produces phenylspirodrimanes, which are immunosuppressive. *Stachybotrys* typically appears as a sooty black fungus occasionally accompanied by a thick mass of white mycelia. *Memnoniella* differs from *Stachybotrys* by producing conidia in chains. As a general rule, air sampling for *Stachybotrys* yields unpredictable results mainly due to the fact that this fungus is usually accompanied by other fungi such as *Aspergillus* and *Penicillium* that normally are better aerosolized than *Stachybotrys*. Bulk or surface sampling of suspect materials can be analyzed in a laboratory for identification by light microscopy. This fungus is a slow grower on media, therefore does not compete well with other rapidly growing fungi. Colonies are powdery in texture, white, pink, orange or black in color. The species *S. chartarum (atra)* produces colonies black in color. (A_w-0.91 - >0.98) Culture – ASCM-1 agar, 20° - 25°C, 7 - 10 days.



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Overview of Toxins

Mycotoxins

Mycotoxins are secondary fungal metabolites that are toxic when consumed by animals and humans. Mycotoxins are not considered a chemical because they have no molecular features in common; instead, the chemical features are diverse and include polyketides, terpenes, and indoles. Mycotoxin function has not been clearly established, but they are considered to play a role in regulating competition with other microorganisms and help parasitic fungi invade host tissues. Mycotoxin production depends on the fungal species, substrate, temperature, pH, presence of other organisms and other environmental conditions. The most frequently studied mycotoxins are produced by species of Aspergillus, Fusarium, Penicillium, Stachybotrys, and Myrothecium, but toxins have been detected from many other fungi under certain growth conditions. There can be more than one fungal species or genus that can produce the same mycotoxin, and a single fungal species can produce more than one mycotoxin.

Mycotoxins can accumulate in fungal spores, mycelia, and growth substrates in concentrations dependant on fungal species and strain. Exposure to mycotoxins occurs when a colonized substrate material is ingested or handled in which skin contact takes place, or aerosolized spores or mycelial fragments are inhaled. Spore inhalation is considered the most common route of exposure and can contain significant concentrations of mycotoxins. Mycotoxin exposures have been linked to a variety of acute and chronic adverse health effects. These effects include symptoms such as pulmonary hemorrhage, dermatitis, recurring cold or flu-like symptoms, burning/ sore throat, headaches, excessive fatigue and diarrhea, and chronic effects include carcinogenicity, mutagenicity, teratogenicity, central nervous system effects, immune system damage, and specific effects of the heart, liver, kidneys, and other organs. Exposures to fungi and mycotoxins are likely to be associated with exposure to other agents as well.

Sampling for mycotoxins can be done in a variety of matrices, including air, bulk, surface, and dust. If there is a large concentration of mycotoxins, air testing can be performed using a 1.0 m PTFE, 37mm cassette and a high-flow pump (15 LPM). Bulk samples are conducted by collecting a 'mass' sample, approximately 25 - 50 g, into a 4 oz glass jar. A methanol swab should be used when surface sampling for mycotoxins, and an area of approximately 5 - 100 cm2 should be sampled. Dust sampling for mycotoxins is collected by a DustChek with a standard household vacuum cleaner or CarpetChek with a high-flow pump (20-40 LPM). The analysis for any of the collection methods is $250 per sample. Aerotech also offers a Mycotoxin, Total Trichothecenes by HPLC with lower detection analysis for a cost of $150 per sample and a Mycotoxin, Total Trichothecenes by ELISA analysis for $55 for air, bulk, surface, and dust.

Overview of Toxins

Endotoxins

Endotoxins are part of the outer membrane of the cell wall of Gram-negative bacteria. When purified from the outer membrane, endotoxins consist of a family of molecules called lipopolysaccharides, or LPS. The lipid portion of LPS, Lipid A, is a chemical distinct from other lipids in biological membranes and is primarily responsible for the molecule's characteristic toxicity. Endotoxins that are encountered in the environment are a part of whole cells or membrane fragments. Endotoxins can contaminate food, animal feed, and various industrial products but are more commonly implicated as a cause of poor indoor air quality.

Endotoxins are highly toxic and are a powerful, nonspecific stimulant to the immune system, resulting in beneficial effects but also adverse outcomes. During an infection with Gram-negative bacteria, endotoxins can cause fever, malaise, changes in white blood cell counts, respiratory distress, shock, and even death. Endotoxins, when inhaled in high concentrations, can cause airway and alveolar inflammation and chest tightness. Experimental studies have shown that inhalation of 20 m of LPS caused airflow obstruction and increased bronchial hyper-reactivity in asthmatics, and higher doses of 200 m caused symptoms in non-asthmatics. Some Gram-negative bacteria capable of producing LPS include E. coli, Salmonella, Shigella, Pseudomonas, and other leading pathogenic bacteria.

Endotoxin sampling can be done by air, bulk, dust, or water. Air sampling for endotoxins consists of using an Endofree (pyrogen-free) cassette and a high-flow pump. Bulk sampling should be conducted by collecting a 'mass' sample, approximately 25 - 50 g, into an Endofree vial. Dust sampling should be collected by an Endofree cassette and a high-flow pump (20 - 40 LPM). When sampling for endotoxins in water an Endofree vial, approximately 10mL, should be used. The analysis for any of the collection methods is $95 per sample. Aerotech also offers a Beta d-Glucans analysis for $250 in air, bulk, dust, and water.

References:

Bioaerosols: Assessment and Control; ACGIH, 1999.

Mycotoxins and Mycotoxicoses; [illegible]
Human Health Effects of Airborne Mycotoxin Exposure in Fungi-Contaminated Indoor Environment; Professional Safety, American Society of Safety Engineers, November 2001.

Bacterial Toxins; [illegible]

Mechanisms of Bacterial Pathogenicity: Endotoxins; [illegible]